

**CLEAN VERSION OF ABSTRACT****RARE-EARTH DOPED PHOSPHATE-GLASS LASERS AND ASSOCIATED METHODS**

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Abstract of the Disclosure

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Apparatus and method for integrating lasers and optics on glass substrates.

An optical (e.g., laser) component formed from a glass substrate doped with a optically active lanthanides species with a plurality of waveguides defined by channels within the substrate. The laser component optionally includes a monolithic array of individual waveguides in which the waveguides form laser resonator cavities with differing resonance characteristics. Another aspect is directed toward pumping the laser wherein a superstrate waveguide cavity, or cladding, is positioned adjacent the substrate waveguide for supplying the latter with pump light. A closed crucible processing of optical waveguides on a glass substrate is also described. Waveguides are created by exposing a surface of the substrate to an ion-exchange solvent (e.g., a molten salt). A tightly sealed multi-part crucible is provided in order that gas does not leak in or out of the crucible during cooling or heating of the system.